

## CLAIMS

1. A method for re-sequencing packets comprising:

a) in each ingress port-adapter (200), inserting a packet rank (PR) into each packet (210) to be switched through a parallel packet switch (250);

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b) switching the ranked packets through the parallel packet switch; and

in each egress port-adapter (260):

c) reading out (600) the switched packets from the parallel packet switch;

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d) storing (605) the switched packets read out from the parallel packet switch into an egress buffer (265);

e) selecting the oldest packet (403) of each of sets of packets stored in the egress port-adapter, each set being comprised of packets coming from the same switching plane and the same ingress port-adapter;

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f) selecting the oldest packet (420) of the oldest packets selected in e) and which come from the same ingress port-adapter, according to the value of their packet ranks, for each ingress port-adapter, thereby providing a subset of

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older packets, each subset corresponding to an ingress port adapter;

g) validating the content of each subset (1030); and

h) selecting the packet to exit the egress port-adapter among  
5 the subsets validated in g).

**2.** The method according to claim 1 wherein e) comprises:

e1) forming a plurality of linked lists (310) of egress  
buffer addresses, each linked list containing the  
egress buffer addresses of the packets switched  
10 through a same said switching plane and coming from the  
same ingress port-adapter and

e2) selecting the oldest address of each of the linked  
lists.

**3.** The method according to claim 2 further comprising

15 associating to each linked list a valid condition which is made  
active when the linked list is active.

**4.** The method according to claim 2 further comprising:

e3) associating to each packet a packet identifier  
representative of a regular, idle or exception status; and

20 e4) associating to each linked list a wildcard condition  
which is made active whenever at least one of the valid  
conditions associated to the linked lists sharing a same  
said source, is active, and an idle packet is read out from the  
parallel packet switch.

25 **5.** The method according to claim 1 wherein g) comprises  
validating a subset of older packets originated from a same  
ingress port-adapter when either one of the valid condition or

corresponding wildcard condition is valid for all switching planes.

6. The method according to claim 1 further comprising:

i) forwarding the packet selected in h); and

j) resetting the set of wildcard conditions associated to the same ingress adapter as the forwarded packet.

7. The method according to claim 1 further comprising:

k) incrementing a waiting packet counter (WPC) each time a packet is received by the egress adapter from the same ingress adapter; and

each time a packet is forwarded:

l) decrementing the waiting packet counter associated to the same ingress adapter as the forwarded packet; and

m) resetting the corresponding valid condition and setting the value of the packet rank of the oldest packet addressed by the corresponding linked list to its maximum, if the value of the associated waiting counter is null.

8. A method for re-sequencing packets carrying a priority which have been switched through the parallel packet switch comprising:

5 a) in each ingress port-adapter, inserting a packet rank into each packet to be switched through the parallel packet switch;

b) switching the ranked packets through the parallel packet switch; and

in each egress port-adapter:

10 c) reading out the switched packets from the parallel packet switch;

d) storing the switched packets read out from the parallel packet switch into an egress buffer;

15 e) selecting the oldest packet of each sets of packets stored in the egress port-adapter, each set being comprised of packets coming from the same switching plane, the same ingress port-adapter with the same priority;

20 f) selecting the oldest packet of the oldest packets selected in e) and which come from the same ingress port-adapter with the same priority, according to the value of their packet ranks, for each ingress port-adapter and each priority, thereby providing a subset of older packets, each subset corresponding to an ingress port-adapter and a priority;

25 g) validating the content of each subset; and

h) selecting the packet to exit the egress port-adapter among the subsets validated in g).

9. The method according to claim 8 wherein e) comprises:

- 5 e1) forming a plurality of linked lists of egress buffer addresses, each linked list containing the egress buffer addresses of the packets switched through a same said switching plane, from a same ingress port-adapter at a same said priority; and
- e2) selecting the oldest address of each of the linked lists.

10 10. The method according to claim 9 further comprising associating to each linked list a valid condition which is made active when the linked list is active.

11. The method according to claim 10 further comprising:

- i) associating to each packet a packet identifier representative of a regular, idle or exception status; and
- 15 j) associating to each linked list a wildcard condition which is made active whenever at least one of the valid conditions associated to the linked list sharing a same said source and a same said priority, is active, and an idle packet is read out from the parallel switch or a regular packet having a priority lower than the one associated to the wildcard
- 20 latch, is read out from the parallel packet switch.

12. The method according to claim 11 wherein g) further comprising validating a subset of older packets originated from a same ingress port-adapter with same priority when either one of the valid condition or corresponding wildcard condition is valid

25 for all switching planes.

13. The method according to claim 11 further comprising:

- k) forwarding the packet selected in h) of claim 8; and

l) resetting the set of wildcard conditions associated to the same ingress adapter and same priority as the forwarded packet.

14. The method according to claim 10 further comprising:

5 m) incrementing a waiting packet counter (WPC) each time a packet is received by the egress adapter from the same ingress adapter with the same priority; and

each time a packet is forwarded:

10 n) decrementing the waiting packet counter associated to the same ingress adapter and same priority as the forwarded packet; and

o) resetting the corresponding valid condition and setting the value of the packet rank of the oldest packet addressed by the corresponding linked list to its maximum, if the value of the associated waiting counter is null.

15 15. A system comprising:

a parallel packet switch;

at least one ingress adapter operably coupled to the parallel packet switch;

20 at least one egress adapter operably coupled to the parallel packet switch wherein said at least one ingress adapter inserts a packet rank into each packet to be switched through said packet switch and said at least one egress adapter receiving switched packets, forming first set of packets from received switched packets, forming  
25 subset of packets based upon predefined characteristics from said first set of packets, validating contents of each subset and selecting a packet to exit said at least one egress adapter from the subset so validated.

16. The system of claim 15 wherein the first set of packets includes oldest packet from sets of packets received in said at least egress adapter wherein each set being comprised of packets coming from same switching plane within said parallel switch and same at least one ingress adapter.

17. The system of claim 16 wherein the predefined characteristics include the oldest of packets in the first set.

10 18. A method for resequencing packets comprising:

a) receiving in at least one egress adapter switched packets;

b) selecting oldest packet from each of sets of packets, each set being comprised of packets coming from a common switching plane and a common ingress adapter; and

c) selecting oldest packet of the oldest packets selected in b) to provide a subset of oldest packets.

19. The method of claim 18 further including

validating contents of each subset; and

20 selecting a packet to exit among the subsets so validated.